Experimental Results of a Low Cost 3D Printed Reconfigurable Modular Robot

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Abstract

Locomotion is the capacity of the alive beings belonging to the animal kingdom that allows them voluntarily to move from one place to another. It is one of the distinguishing features of the animals in contrast to plants, this concept is extendable to machines with capacity of displacement.

The reconfigurable modular robots approach is emerging in the field of adaptive systems, this kind of robots are made up of several interconnected modules that allows them to change their structure and locomotion type in order to better adapt to dynamic environments.

In this study, the experimental results of a low cost 3D printed reconfigurable modular robot are presented. This robot has been completely designed, implemented and tested in a fab lab using digital fabrication techniques.

The different locomotion types generated because of reconfiguration of the robot has been documented and the model of the system has been simplified in order to better understand and obtain the equations of the angular movements. The developed robot has three modules, each one with two degrees of freedom and a snap magnetic system which allows the mechanical joint between modules.

The modular robot was able to make a self-reconfiguration, going from "wheel-type" to "snake-type" locomotion.

Keywords

Modular systems, robotics, self-reconfiguration *, adaptation, 3D printing.*